

Curriculum Vitae

Dr. Adam M. Daly
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EDUCATION

Ph.D., Chemistry, University of Arizona, Tucson Arizona December 2010

Title: Gas Phase Structures and Molecular Constants of Dimers and Molecules determined using Microwave Spectroscopy

Advisor: Dr. Stephen G. Kukolich Major: Physical Minor: Inorganic

B.S., Chemistry Humboldt State University December 2000

B.S., Physics Humboldt State University December 1999

TEACHING EXPERIENCE

CSU – Los Angeles Adjunct Professor		Spring 2014-Present
Quantitative Analysis Laboratory	Chem 362	Summer Quarter 2014
Presentations in Chemistry and Biochemistry	Chem 500	Spring Quarter 2014
General Chemistry Laboratory	Chem 103	Spring Quarter 2014

University of Arizona		Fall 2004 - Fall 2010
Directed Research	Chem 499	Fall - Spring 2006 - 2010
Physical Chemistry Laboratory	Chem 401	Spring 2006 & 2007
Organic Chemistry Laboratory	Chem 200	Summer 2005 & 2006
Honors General Chemistry Laboratory	Chem 151	Fall - Spring 2004 - 2005

Teaching Awards

Best Teaching Assistant Southern Arizona ACS University of Arizona 2006-2007

RESEARCH EXPERIENCE

Postdoctoral:

Caltech Postdoctoral Scholar	Jet Propulsion Laboratory	Pasadena, CA	Apr 2013 – Apr 2014
Postdoctoral Researcher	University of Valladolid	Valladolid, Spain	Mar 2011 – Dec 2012

Industrial:

Associate Scientist	Aradigm Corporation	Hayward, CA	1998-2004
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EDUCATION DETAILS:

Ph.D., Chemistry, University of Arizona, Tucson Arizona December 2010

Title: Gas Phase Structures and Molecular Constants of Dimers and Molecules determined using Microwave Spectroscopy

Gas phase structures and other molecular parameters have been investigated for several inorganic and organic molecules and dimers using Pulsed Beam Fourier Transform Microwave Spectroscopy. An automated control system was designed and utilized for the systematic observation of the microwave spectrum for many molecules. The analysis of the spectrum using the quantum mechanics of angular momentum allowed the determination of important molecular parameters such as: gas phase structure, chemical bonding environments and critical evaluation of theoretical models.

Advisor: Dr. Stephen G. Kukolich

Major: Physical

Minor: Inorganic

Training in all areas common to gas phase spectroscopy and organometallic synthesis:

- High vacuum techniques, Signal generation, conditioning and recording.
- Analysis of high-resolution microwave, submillimeter and IR spectra.
- High level calculations of complex molecular systems: Gaussian 03, GAUSS.
- Air/water/light sensitive synthesis and sample handling
- Computer programming experience in C++ , FORTRAN, LabVIEW and MATLAB.
- Publication tools/software: LaTeX, Ghostscript, MS-Office

PUBLICATIONS AND PRESENTATIONS

Presentations:

- Departmental presentations each semester (60 minutes) on research progress: 8 seminars
- 2010 Ohio State University Molecular Spectroscopy Conference
Microwave Spectrum and Partial Gas Phase Structure of a Formic Acid- Formamide Complex.
Microwave Spectrum of the Hydrogen Bonded Complex Between Propiolic and Formic Acid.
- 2009 Ohio State University Molecular Spectroscopy Conference
Calculations and Gas Phase Measurements of the Complex Formed with Ferrocene and HCl.

Publications:

I have attached the list of publications at the end of the CV. Undergraduate authors are italicized. The majority of first author publications occurred in my graduate career (8) with a total of 10 with 2 in progress. A total of **21 publications**:

- Jet Propulsion Laboratories: 2 publications and 2 in progress in atmospheric sciences
- GEM-Valladolid: 5 Astrophysical / 6 Biological with 1 in progress
- University of Arizona: 8 Gas phase microwave (Dimers and Organometallic complexes)

Collaborations with these organizations remain intact and will be vital for the laboratory work I plan.

TEACHING DETAILS:

California State University – Los Angeles

Apr – Present 2014

Adjunct Faculty for the Department of Chemistry and Biochemistry

Chem 500

Presentations in Chemistry and Biological Sciences

Class of 13 graduate students. Course description from CSU Catalog:

A student presentation and laboratory observation class designed to prepare chemistry and biochemistry graduate students to deliver presentations and/or experimental demonstrations for both research seminars and undergraduate laboratory classrooms.

Chem 103L

General Chemistry Laboratory

Class of 22 students. Course description from CSU Catalog:

Introduction to science of thermodynamics and its applications in chemistry, chemical kinetics, spectroscopy and special topics in general chemistry. Lecture 3 hours, laboratory 6 hours.

Chem 362L

Quantitative Analysis

Class of 18 students. Course description from CSU Catalog:

Principles and techniques of analytical chemistry, including stoichiometry, equilibrium (pH and redox), electrochemistry, spectroscopy, and separations. Lecture 3 hours, laboratory 6 hours.

University of Arizona

Aug 2004 – Dec 2007

Chem 105 Honors General Chemistry and Laboratory

Aug 2004-Jun 2004

2 laboratories with 24 students each and two discussion periods:

Fundamental concepts of modern chemistry, with emphasis on theoretical and physical principles; atomic and molecular structure and quantum theory; chemical bonding properties of gases, liquids and solids; solutions; thermochemistry.

Physical Chemistry Laboratories

Spring 2005-Jun 2007

This course concerns the teaching of modern experimental methods in physical chemistry. The goal is to illustrate concepts in thermodynamics, quantum mechanics, and chemical kinetics, taught in the lecture courses 480A and 480B, through experiments concerning heat capacities, liquid/vapor equilibria, surface tension, viscosity, quantum dots, and atomic and molecular spectroscopy. Practical training is provided in the use of vacuum systems, detection electronics, oscilloscopes, simple lasers, and other modern tools in the physical chemistry laboratory, as well as in quantitative error analysis and scientific writing.

RESEARCH DETAILS:

Jet Propulsion Laboratory

Pasadena, CA

Apr 2013 – Apr 2014

California Institute of Technology Postdoctoral Scholar

Year 1: Study of reactive species in the atmosphere in which we published the high frequency analysis of CH₂OO and the identification of new vibrational states of the parent ethyl cyanide.

Year 2: Analysis of rotational and high resolution infrared data of C₂H₅D to help detect this molecule on exoplanets using remote sensing. I have been invited to continue the work in which we identified new vibrational states of ethyl cyanide in the spectrum of Orion by analyzing ¹³C species.

University of Arizona

Tucson, AZ

Jan 2013 – Mar 2013

Postdoctoral Researcher

During the gap between my post-doctoral positions, my research advisor invited me to return to the laboratory and revive several projects from our previous work together. We focused on complexes of organic acids to investigate the proton tunneling phenomenon that models complex phenomenon in biological molecules such as DNA. In the short time there we were able to obtain the spectrum of several new organic acids and one dimer. We also experimented with several molecules with nitrogen to attempt to measure the tunneling phenomenon in molecules containing this functional group but were not successful, yet!

University of Valladolid

Valladolid, Spain

Mar 2011 – Dec 2012

Postdoctoral Researcher

Upon graduation, I was invited to work in the laboratory of José Luis Alonso at the University of Valladolid. We met at the OSU conference of molecular spectroscopy and he had received a grant to open a new area of research in his laboratory that coincided with my graduation. The grant involved the construction of a high frequency spectrometer that would meet the needs of the Spanish astronomical community that had just formed a national network: CONSOLIDER. I arrived to a laboratory with several boxes on the floor and within one year, we had a unique and successful millimeter and submillimeter laboratory in operation that identified several new vibrational states in the interstellar medium. I also worked on projects using the laser ablation microwave spectrometer of several biological molecules such as the sugars: Deoxyribose, Lyxose, Mannose, Galactopyranose, Arabinose, Erythrose. As part of my projects in Valladolid, I developed a multiple sample acquisition system that continues to allow the detection of very weak signals without costly sample exhaustion.

Associate Scientist at Aradigm Corporation

Hayward, CA

Jan 1998- Feb 2004

I started as a research technician for the pain management system that sought to deliver morphine into the deep lung for cancer patients. In six years I was promoted to Associate Scientist of the diabetes management system and was responsible for collaboration between engineers, scientists and businessmen. I served on many interdisciplinary teams and utilized many statistical models to present and publish our team's work.

REFERENCES

Dr. Stephen G. Kukolich

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Ph.D. Advisor

Department of Chemistry and Biochemistry

University of Arizona

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Dr. Robert Vellanweth

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Department Chair

Department of Chemistry and Biochemistry

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Los Angeles, CA 90032-8202

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Dr. Brian J. Drouin

Brian.J.Drouin@jpl.nasa.gov

Postdoctoral Supervisor

Jet Propulsion Laboratory

M/S 183-301

4800 Oak Grove Drive

Pasadena, CA 91109

Phone: (818) 393 6259

Fax: (818) 354 0966

PUBLICATIONS:

[Precision frequency measurement of N₂O transitions near 4.5 μm and above 150 μm](#)

WJ Ting, CH Chang, SE Chen, HC Chen, JT Shy, BJ Drouin, AM Daly
JOSA B 31 (8), 1954-1963 2014

[Laboratory Characterization and Astrophysical Detection of Vibrationally Excited States of Vinyl Cyanide in Orion-KL](#)

A López, B Tercero, Z Kisiel, AM Daly, C Bermúdez, H Calcutt, ...
arXiv preprint arXiv:1407.4363 2014

[Submillimeter measurements of the Criegee intermediate CH₂OO, in the gas phase](#)

AM Daly, BJ Drouin, S Yu
Journal of Molecular Spectroscopy 297, 16-20 2014

[Spectroscopic characterization and detection of Ethyl Mercaptan in Orion](#)

L Kolesníková, B Tercero, J Cernicharo, JL Alonso, AM Daly, BP Gordon, ...
The Astrophysical Journal Letters 784 (1), L7 2014

[Six Pyranoside Forms of Free 2-Deoxy-D-ribose](#)

I Peña, EJ Cocinero, C Cabezas, A Lesarri, S Mata, P Écija, AM Daly, ...
Angewandte Chemie 125 (45), 12056-12061 2013

[The millimeter wave tunneling–rotational spectrum of phenol](#)

L Kolesníková, AM Daly, JL Alonso, B Tercero, J Cernicharo
Journal of Molecular Spectroscopy 289, 13-20 2013

[Laboratory Characterization and Astrophysical Detection of Vibrationally Excited States of Ethyl Cyanide](#)

AM Daly, C Bermúdez, A López, B Tercero, JC Pearson, N Marcelino, ...
The Astrophysical Journal 768 (1), 81 2013

[Unveiling the Sweet Conformations of D-Fructopyranose](#)

C Bermúdez, I Peña, C Cabezas, AM Daly, JL Alonso
ChemPhysChem 14 (5), 893-895 2013

[Erythrose revealed as furanose forms](#)

C Cabezas, I Peña, AM Daly, JL Alonso
Chemical Communications 49 (92), 10826-10828 2013

[Conformations of d-xylose: the pivotal role of the intramolecular hydrogen-bonding](#)

I Peña, S Mata, A Martín, C Cabezas, AM Daly, JL Alonso
Physical Chemistry Chemical Physics 15 (41), 18243-18248 2013

The alanine model dipeptide Ac-Ala-NH₂ exists as a mixture of C_{eq}7 and C₅ conformers

C Cabezas, M Varela, V Cortijo, AI Jiménez, I Peña, AM Daly, JC López, ...

Physical Chemistry Chemical Physics 15 (7), 2580-2585 2013

Disentangling the Puzzle of Hydrogen Bonding in Vitamin C

I Peña, AM Daly, C Cabezas, S Mata, C Bermúdez, A Niño, JC López, ...

The Journal of Physical Chemistry Letters 4 (1), 65-69 2012

Microwave spectrum of arsenic triphosphide

AM Daly, BM Cossairt, G Southwood, SJ Carey, CC Cummins, ...

Journal of Molecular Spectroscopy 278, 68-71 2012

LA-MB-FTMW spectroscopy of AlCCH and AgCCH with a discharge source

C Cabezas, S Mata, AM Daly, A Martín, JL Alonso, J Cernicharo

Journal of Molecular Spectroscopy 278, 31-34 2012

Microwave measurements of proton tunneling and structural parameters for the propiolic acid-formic acid dimer

AM Daly, KO Douglass, LC Sarkozy, JL Neill, MT Muckle, DP Zaleski, ...

The Journal of chemical physics 135 (15), 154304 2011

Microwave spectra, *ab initio* and DFT calculations and molecular structure for (η^7 -cycloheptatriene) Ti (η^5 -cyclopentadienyl) and (η^7 -cycloheptatriene) Cr (η^5 -cyclopentadienyl)

AM Daly, *CM Lavin, ES Weidenschilling, AM Holden*, SG Kukolich

Journal of Molecular Spectroscopy 267 (1), 172-177 2011

Microwave Spectra and Gas Phase Structural Parameters for N-Hydroxypyridine-2 (1 H)-thione

AM Daly, EG Mitchell, *DA Sanchez*, E Block, SG Kukolich

The Journal of Physical Chemistry A 115 (50), 14526-14530 2011

Microwave spectrum and structural parameters for the formamide-formic acid dimer

AM Daly, *BA Sargus*, SG Kukolich

The Journal of chemical physics 133 (17), 174304 2010

Microwave Spectrum, Structural Parameters, and Quadrupole Coupling for 1, 2-Dihydro-1, 2-azaborine

AM Daly, C Tanjaroan, AJV Marwitz, SY Liu, SG Kukolich

Journal of the American Chemical Society 132 (15), 5501-5506 2010

Microwave measurements and *ab initio* calculations of structural and electronic properties of N-Et-1, 2-azaborine

C Tanjaroan, A Daly, AJV Marwitz, SY Liu, S Kukolich

The Journal of chemical physics 131 (22), 224312 2009

The rotational spectrum and structure for the argon-cyclopentadienyl thallium van der Waals complex:
Experimental and computational studies of noncovalent bonding in an organometallic π -complex

C Tanjaroon, AM Daly, SG Kukolich

The Journal of chemical physics 129 (5), 054305 2008

Microwave Spectra and Gas-Phase Structural Parameters of Bis (η^5 -cyclopentadienyl) tungsten
Dihydride

BS Tackett, C Karunatilaka, AM Daly, SG Kukolich

Organometallics 26 (8), 2070-2076 2006